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IS 10-1 (1990): Plywood Tea-Chests: Part-1 General [CED 9: Timber and Timber Stores]



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भारतीय मानक

प्लाईवुड चाय-पेटियों की विशिष्टि

भाग 1 सामान्य

(पाँचवां पुनरीक्षण)

Indian Standard

PLYWOOD TEA-CHESTS — SPECIFICATION

PART 1 GENERAL

(Fifth Revision)

UDC 621.788.123 [674 - 419.32 : 663.95]

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 1) (Fifth Revision) was adopted by the Bureau of Indian Standards on 23 March 1990, after the draft finalized by the Timber Stores Sectional Committee had been approved by the Civil Engineering Division Council.

IS 10 : 1970 covered provisions relating to different components of plywood tea-chest. In its fourth revision it was published in the following five parts:

<i>IS No.</i>	<i>Title</i>
10 (Part 1) : 1976	Specification for plywood tea-chests: Part 1 General (<i>fourth revision</i>)
10 (Part 2) : 1976	Specification for plywood tea-chests: Part 2 Plywood (<i>fourth revision</i>)
10 (Part 3) : 1974	Specification for plywood tea-chest: Part 3 Battens (<i>fourth revision</i>)
10 (Part 4) : 1976	Specification for plywood tea-chest: Part 4 Metal fittings (<i>fourth revision</i>)
10 (Part 5) : 1976	Specification for plywood tea-chest: Part 5 Assembly and packing (<i>fourth revision</i>)

In this fifth revision of Part 1 Amendments No. 1 to 3 are incorporated and the standard is updated as a result of the experience gained by its implementation by tea-chest industry and the testing laboratories. The methods of tests for end compression test and drop test and their reporting have been elaborately revised with reference to the methods given for the testing of transport packages in IS 7028 (Part 4) : 1987 'Performance test for complete, filled transport packages : Part 4 Vertical impact drop test (*first revision*)' and IS 7028 (Part 6) : 1973 'Performance test for complete filled transport packages: Part 6 Compression test' respectively which are based on ISO standards.

In the formulation of this standard due weightage has been given to international coordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PLYWOOD TEA-CHESTS — SPECIFICATION

PART 1 GENERAL

(Fifth Revision)

1 SCOPE

1.1 This Indian Standard (Part 1) covers materials, standard sizes, design, tare and tests for plywood tea-chests.

2 REFERENCES

2.1 The standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 707 : 1976 shall apply.

4 MATERIAL

4.1 Battens

Battens shall conform to IS 10 (Part 3) : 1974.

4.2 Plywood

Plywood panels shall conform to IS 10 (Part 2) : 1976.

4.3 Fittings

Metal fittings shall conform to IS 10 (Part 4) : 1990.

4.4 Batten Covers

Tissue paper shall be used as cover for battens in the assembled tea-chest.

4.5 Linings

Any of the following lining materials may be used:

- a) Aluminium foil of 0.020 ± 0.002 mm interlined with tissue paper;
- b) Aluminium foil of 0.009 ± 0.001 mm laminated with 20 to 30 g/m² paper conforming to IS 8970 : 1978;
- c) Cellulose film of 0.022 mm \pm 10 percent conforming to grade 300 coated with polyvinylidene chloride (PVDC) or nitrocellulose lacquer of IS 5012 : 1987.
- d) Metallized polyester film of minimum thickness 12 micron (0.012 mm) and conforming to the following requirements:

Sl Characteristic Requirement Method of Test No.

- i) Tensile strength, *Min* 2 060 N/m 12.3 of IS 1060 (Part 1) : 1966
- ii) Puncture strength, *Min* 1.42 N.m 9 of IS 4006 (Part 2) : 1985

Sl Characteristic Requirement Method of Test No.

- iii) Water vapour permeability at $38 \pm 1^\circ\text{C}$ and 90 ± 2 percent RH, *Max* 5 g/m²/24 h 14 of IS 1060 (Part 2) : 1960

- iv) Water absorption 24 h, *Max* 1 percent A weighed sample shall be immersed in distilled water at $27 \pm 1^\circ\text{C}$ for a period of 24 h and the same shall be reweighed after removing the surface water. From the weight gain so obtained, percentage water absorption shall be calculated.

- v) Toxicity Non-toxic Toxicity shall be tested by preparation of film extracts and systemic administration to laboratory animals and implantation of polyester film in the muscles of rabbits. No mortality or any other signs of toxicity shall be observed.

- vi) Thermal stability range Unaffected and stable on storage at 130°C The film shall be exposed to the temperature as stated for a period of 6 weeks and subjected to tests stated under 4(C) and 4(D). There shall be no variation in the property of the film.

4.6 Nails

Nails used for corner, top and bottom of tea-chest shall be slat nails (see IS 723 : 1972).

5 DESIGN OF TEA-CHEST

5.1 The tea-chest shall be assembled as indicated in Fig. 1 from six panels of plywood forming a shook and 12 battens together with other accessories specified in Table 1.

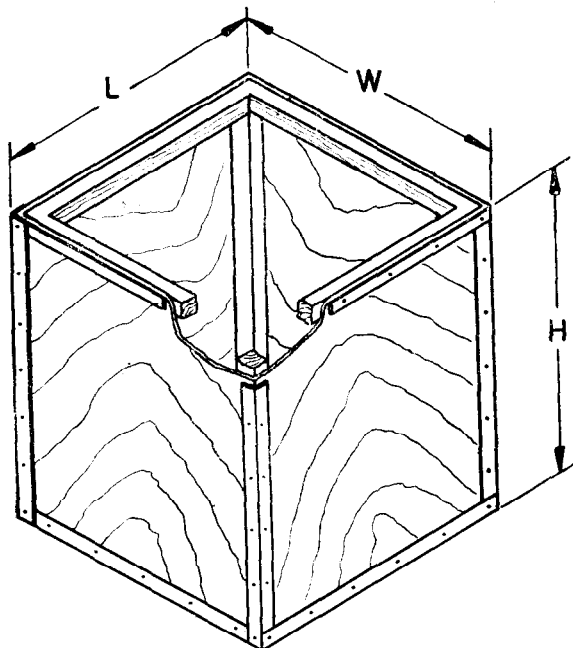


FIG. 1 TEA-CHEST

6 SIZES

6.1 Tea-chests shall be of any of the following sizes the dimensions as given may be the outside dimensions of tea-chest:

Length	Width	Height
L	W	H
mm	mm	mm
400	500	600
480	480	600
480	480	560
460	460	500
400	400	600
400	400	500
400	400	450

6.1.1 Any other sizes as agreed to between the manufacturer and the purchaser shall be permitted provided the dimensions do not exceed the maximum as specified in 6.1:

NOTE — For export of tea-chest shooks only, tea-chests with the following dimensions may be permitted:

- a) 490 mm × 490 mm × 610 mm,
- b) 410 mm × 510 mm × 610 mm, and
- c) 410 mm × 410 mm × 610 mm.

6.1.2 For packing instant tea, the following size of tea-chest may also be permitted in addition to the sizes mentioned under 6.1:

380 mm × 685 mm × 845 mm

6.1.2.1 The tea-chest of size mentioned in 6.1.2, used for packing instant tea, shall conform to the provisions laid down in Table 1.

7 TARE

7.1 Maximum Permissible Mass of Empty Tea-Chest

The mass of tea-chest when empty shall be not

more than the maximum prescribed for it in SI No. (iv) of Table 1.

7.1.1 The mass of shooks if stipulated in the purchase agreement shall not vary from the agreed mass by more than ± 3 percent.

7.2 Certificate of Tare

The supplier shall state in the despatch document (challan) for each consignment the tare of the tea-chests.

7.2.1 The mass of tea-chest shall not vary by more than ± 10 percent of the mass as stated in the certificate of tare and shall not exceed the maximum specified in Table 1.

7.2.2 The supplier shall also indicate in the despatch document (challan) for each consignment the species of timber used for plywood and battens separately and the size of tea-chests.

8 TYPE APPROVAL TESTS FOR TEA-CHESTS

8.1 End Compression Test

8.1.1 Five tea-chests of the size 480 mm × 480 mm × 600 mm assembled in accordance with Part 5 of this standard shall be fully packed with dry saw dust weighing 50 kg. The tea-chests shall be conditioned at a temperature of 27 ± 2°C and RH 65 ± 5% for 48 hours. The filled tea-chests shall be subjected to end compression test in vertical position, as per IS : 7028 (Part 6) : 1973. The maximum compression load under which the tea-chest starts bulging and permanent depression appears on the sides shall be recorded for each tea-chests. The average of the compression loads at which the tea-chests fail shall be not less than 50 kN. Corresponding figures for other sizes shall be subjected to agreement between the purchaser and the supplier.

8.1.2 Alternative Test

The five tea-chests assembled in accordance with Part 5 of this standard, shall be filled with the saw dust and conditioned to the conditions as given in 8.1.1 when subjected to a constant compression load of 20 kN and maintained under the same condition for a duration of 3 hours shall show no visible sign of deterioration. Corresponding figures for other sizes shall be subjected to agreement between the purchaser and the supplier.

8.2 Corner Drop Test

8.2.1 Five tea-chests assembled and conditioned as described in 8.1.1 shall be tested for end drop test as per method given in IS : 7028 (Part 4) : 1987. Each tea-chest shall be dropped on each corner from progressively increasing heights until a height of 1 000 mm is reached. The starting height shall be 150 mm with an increment of 150 mm up to 900 mm and the final increment of 100 mm. The tea-chests at the end of each drop shall be examined for any failure. The tea-chests shall be deemed to have completely failed when:

- a) the contents begin to spill freely, or

Table 1 Accessories of Tea-Chest

(Clause 5.1, 6.1.2.1 and 7.1)

Sl No.	Parts	Location	Tea-Chest, mm							
			400 × 500 × 600	480 × 480 × 600	480 × 480 × 560	460 × 460 × 500	400 × 400 × 600	400 × 400 × 500	400 × 400 × 450	380 × 685 × 845
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	Batten covers (tissue paper)	Corners, T and B	4 pieces 550 mm × 100 mm 4 pieces 480 mm × 100 mm 4 pieces 380 mm × 100 mm	4 pieces 550 mm × 100 mm 8 pieces 460 mm × 100 mm	4 pieces 510 mm × 100 mm 8 pieces 460 mm × 100 mm	4 pieces 450 mm × 100 mm 8 pieces 440 mm × 100 mm	4 pieces 550 mm × 100 mm 8 pieces 380 mm × 100 mm	4 pieces 450 mm × 100 mm 8 pieces 380 mm × 100 mm	4 pieces 400 mm × 100 mm 8 pieces 380 mm × 100 mm	Not applicable. Instant tea shall be packed in polyethylene inner liners (bags)
ii)	*Linings	Sides, T and B	2 sheets 630 mm × 495 mm 2 sheets 630 mm × 395 mm 2 sheets 395 mm × 495 mm	4 sheets 630 mm × 475 mm 2 sheets 475 mm × 475 mm	4 sheets 460 mm × 100 mm 2 sheets 475 mm × 475 mm	4 sheets 530 mm × 455 mm 2 sheets 455 mm × 455 mm	4 sheets 630 mm × 395 mm 2 sheets 395 mm × 395 mm	4 sheets 530 mm × 395 mm 2 sheets 395 mm × 395 mm	4 sheets 480 mm × 395 mm 2 sheets 395 mm × 395 mm	
iii)	Slating nails	Corner, T and B	216 pieces 25 mm × 2 mm distributed as follows: 72 for 4 corner metals 112 for 8 top and bottom metals 24 for fixing 8 top and bottom battens to shooks 8 for 2 top and bottom shooks	232 pieces 25 mm × 2 mm distributed as follows: 88 for 4 corner metals 112 for 8 top and bottom metals 24 for fixing 8 top and bottom battens to shooks 8 for 2 top and bottom shooks	208 pieces 25 mm × 2 mm distributed as follows: 64 for 4 corner metals 112 for 8 top and bottom metals 24 for fixing 8 top and bottom battens to shooks 8 for 2 top and bottom shooks	184 pieces 25 mm × 2 mm distributed as follows: 64 for 4 corner metals 96 for 8 top and bottom metals 16 for fixing 8 top and bottom battens to shooks 8 for 2 top and bottom shooks	216 pieces 25 mm × 2 mm distributed as follows: 88 for 4 corner metals 96 for 8 top and bottom metals 8 for 2 top and bottom shooks 24 for fixing 8 top and bottom battens to shooks	184 pieces 25 mm × 2 mm distributed as follows: 64 for 4 corner metals 96 for 8 top and bottom metals 8 for 2 top and bottom shooks 16 for fixing 8 top and bottom battens to shooks	184 pieces 25 mm × 2 mm distributed as follows: 64 for 4 corner metals 96 for 8 top and bottom metals 8 for 2 top and bottom shooks 16 for fixing 8 top and bottom battens to shooks	192 pieces per tea-chest distributed as follows: 16 for corner of 38 mm × 2 mm size 176 of 25 mm × 2 mm size
iv)	Maximum permissible mass of empty tea-chest	—	9 kg	9 kg	9 kg	7.5 kg	6 kg	6 kg	6 kg	10 kg

T = Top
B = Bottom

*When tea-chest of any size mentioned under col 4 to 10 are used for packing of instant tea, provisions relating to lining shall not be applicable. Instant tea shall however, be packed in polyethylene inner liners (bags).

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b) one edge breaks open along its entire length.

Corresponding figures for other sizes shall be subjected to agreement between the purchaser and the supplier.

8.2.2 Alternative Test

Tea-chests, filled as described in 8.1.2 shall be dropped successively on each corner from a constant height of 600 mm and repeated three times from the same height. There shall be no visible signs of deterioration. Corresponding figures for other sizes shall be subject to agreement between the purchaser and the supplier.

NOTE — The following are some of the typical visible signs of deterioration at the end of the above tests:

- a) Appearance of bulging and depressions on sides,
- b) Wrinkling of metal bindings on edges,

- c) Loosening or bending or breaking of any nails,
- d) Delamination of plies, and
- e) Other failures.

8.3 Report

The results of tests on the tea-chests shall be reported as outlined in Annex B.

9 MARKING

9.1 Unless otherwise specified, each tea-chest shall be legibly and indelibly marked with the following information:

- a) Indication of the source of manufacture,
- b) Year of manufacture, and
- c) Size (see 6.1).

9.1.1 Each packaging case may also be marked with the Standard Mark.

ANNEX A
(Clause 2.1)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
10 (Part 2) : 1976	Plywood tea-chests: Part 2 Plywood (<i>fourth revision</i>)	1060 (Part 4) : 1966	Method of sampling and test for paper and allied products: Part 4 (<i>revised</i>)
10 (Part 3) : 1974	Plywood tea-chests: Part 3 Battens (<i>fourth revision</i>)	4006 (Part 2) : 1985	Methods of test for paper and pulp based packaging materials: Part 2 (<i>first revision</i>)
10 (Part 4) : 1990	Plywood tea-chests: Part 4 Metal fittings (<i>fifth revision</i>)	5012 : 1987	Cellulose film (<i>first revision</i>)
10 (Part 5) : 1976	Plywood tea-chests: Part 5 Assembly and packing (<i>fourth revision</i>)	7028 (Part 4) : 1987	Performance tests for complete, filled transport packages: Part 4 Vertical impact drop test (<i>first revision</i>)
707 : 1976	Glossary of terms applicable to timber technology and utilization (<i>second revision</i>)	7028 (Part 6) : 1973	Performance tests for complete, filled transport packages: Part 6 Compression test
723 : 1972	Steel counter sunk head wire nails (<i>second revision</i>)	8970 : 1978	Paper aluminium foil laminates for packaging of food and pharmaceuticals

ANNEX B
(Clause 8.3)

PROFORMA OF REPORT FOR TESTS ON TEA-CHESTS

1. Name and address of maker or fabricator.....
2. Species employed for:
 - a) Outer faces.....
 - b) Other veneers.....
 - c) Battens.....
3. Size of tea-chest.....
4. Thickness of plywood in mm:
 - a) Nominal.....
 - b) Actual average.....
5. No. of veneers in plywood.....

IS 10 (Part 1) : 1990

6. Tare:
 a) Actual average mass of empty tea-chest in kg.....
 b) Quoted mass of empty tea-chest in kg.....
 7. Results of test:
 a) See 8.1.1 and 8.2.1.

End-Compression		Progressive Corner Drop	
Chest No.	Maximum Load, kN	Chest No.	Maximum Drop, cm
1		6	
2		7	
3		8	
4		9	
5		10	
Average		Average	

- b) Alternate method (see 8.1.2 and 8.2.2):

8. Report on the scheme of nailing and metal fittings according to Table 1.....
 9. General remarks on compliance with the specification.....
 10. Certified that:

Tea-chests conform to IS 10 (Part 4) : 1990 'Specification for plywood tea-chests: Part 1 General (*fifth revision*)' in all respects.

OR

Tea-chests fail to conform to IS 10 (Part 1) : 1990 'Specification for plywood tea-chests: Part 1 General (*fifth revision*)' for the reasons given in 9 above.

Signature of Testing Officer.....
 Designation.....
 Name of Testing Laboratory... ..

Sl No.	Failures	End Compression					Corner Drop				
		Chest No.	Chcst No.	Chest No.	Chest No.	Chest No.	Chest No.	Chest No.	Chest No.	Chest No.	Chest No.
(1)	(2)	1	2	3	4	5	6	7	8	9	10
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	i) Appearance of bulging and depression on sides										
	ii) Wrinkling of metal binding on edges										
	iii) Loosening or bending or breaking of any nails										
	iv) Delamination of piles										
	v) Tearing of plywood for metal fitting through nails										
	vi) Crushing of corners										
	vii) Splitting or breaking of battens										
	viii) Any other failures										

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